Polynomial Practice

Name: Key

In Exercises 7–10, classify the polynomial by degree and by number of terms

7. $-5x - 4$

linear binomial

8. -7

constant monomial

9. $16 - 4x + 3x^2$

quadratic trinomial

10. $3x^2 + 6x + 1$

quadratic trinomial

In Exercises 1 and 2, perform the indicated operation. (10.1)

1. $(x^2 + 2x - 1) + (3x - 4x^2 + 2)$

$-3x^2+5x+1$

2. $(-2x^2 + 4x - 5) - (3 - 7x + x^2)$

$-3x^2+11x-8$

In Exercises 3 and 4, perform the indicated operation. (10.1)

3. $(3x^2 - x + 2) + (x^2 - 3x + 2)$

$4x^2-4x+4$

4. $(7x^2 - 5x + 10) - (3x^2 + 2x + 5)$

$4x^2-7x+5$

In Exercises 5–8, multiply. (10.2)

5. $(3x + 2)(3x + 5)$ $9x^2+21x+10$

6. $(4x - 5)(2x + 10)$ $8x^2+30x-50$

7. $(x + 1)(2x^2 - 3x + 2)$

$2x^3-x^2-x+2$

8. $(2x + 1)(5x^2 + 7x - 3)$

$10x^3+19x^2+x-3$

In Exercises 9–12, multiply using the FOIL pattern. (10.2)

9. $(x + 2)(x - 3)$ x^2-x-6

10. $(x - 3)(x - 6)$ $x^2-9x+18$

11. $(2x + 3)(4 - x)$ $-2x^2+5x+12$

12. $(3 + x)(4 + x)$ $x^2+7x+12$

In Exercises 13–16, use the special-product patterns to multiply. (10.3)

13. $(2x + 3)^2$ $4x^2+12x+9$

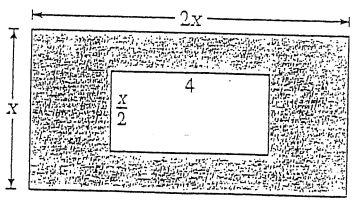
14. $(4x - 5)^2$ $16x^2-40x+25$

15. $(2x - 6)(2x + 6)$ $4x^2-24x+36$

16. $(x - 7)(x + 7)$ x^2-49

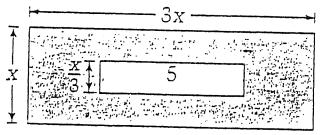
Geometry In Exercises 35 and 36, find the area of the shaded region.

35.



$A = 2x^2 - 2x$

36.



$A = 3x^2 - \frac{5}{3}x$

Real-World Connection

There were about 12 million students enrolled in college in 1980, 13.8 million in 1990, and 15 million in 2000.

55. Graduation You can model the number of men and women in the Unite States who enrolled in college within a year of graduating from high sch with the linear equations shown below. Let t equal the year of enrollmer $t = 0$ corresponding to 1990. Let $m(t)$ equal the number of men in thous and let $w(t)$ equal the number of women in thousands.

$m(t) = 35.4t + 1146.8$ men enrolled in college

$w(t) = 21.6t + 1185.5$ women enrolled in college

a. Add the expressions on the right side of each equation to model the t number of recent high school graduates $p(t)$ who enrolled in college b 1990 and 1998.

b. Use the equation you created in part (a) to find the number of high sc graduates who enrolled in college in 1995.

c. Critical Thinking If you had subtracted the expressions on the right side of each equation above, what information would the resulting expression model?

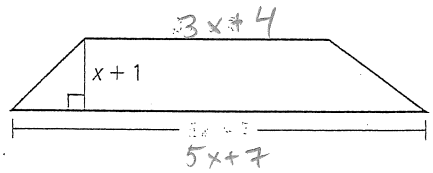
a) $p(t) = 56.0t + 2332.3$

b) $t = 8$ $p(t) = 2780.3$ (thousands)

c) The difference between #'s of men & women enrolled.

CONNECTION Find an expression for the area of the figure. (*Hint:* the *Table of Formulas* is on p. 813.) Give your answer as a quadratic polynomial.

52.



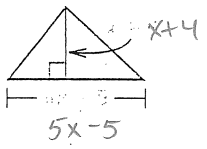
$h = x+1$
$b_1 = 3x+4$
$b_2 = 5x+7$

$A = \frac{1}{2}h(b_1 + b_2)$

$A = \frac{1}{2}(x+1)(3x+4+5x+7)$

$A = 4x^2 + \frac{19}{2}x + \frac{11}{2}$

53.



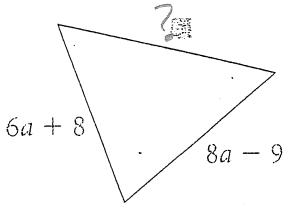
$h = x+4$
$b = 5x-5$

$A = \frac{1}{2}bh$

$A = \frac{1}{2}(5x-5)(x+4)$

$A = \frac{5}{2}x^2 + \frac{15}{2}x - 10$

50. Perimeter $= 23a - 7$



$P = 6a+8+8a-9+?$

$23a-7$

$23a-7 = 14a-1+?$

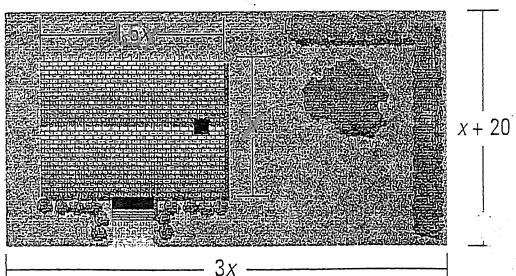
$-14a+1 \quad -14a+1$

$9a-6 = ?$

BUILDING A HOUSE In Exercises 63 and 64, you plan to build a house that is $1\frac{1}{2}$ times as long as it is wide. You want the land around the house to be 20 feet wider than the width of the house, and twice as long as the length of the house, as shown at the right.

63. Write an expression for the area of the land surrounding the house.

64. If $x = 30$ feet, what is the area of the house? What is the area of the entire property?



Area land $= (3x)(x+20) - x(1.5x)$

Adding, Subtracting, Multiplying Polynomials

Name:

a Add.

1. $(3x + 2) + (-4x + 3)$ $-x+5$
2. $(6x + 1) + (-7x + 2)$ $-x+3$
3. $(-6x + 2) + (x^2 + x - 3)$ x^2-5x-1
4. $(x^2 - 5x + 4) + (8x - 9)$ x^2+3x-5
5. $(x^2 - 9) + (x^2 + 9)$ $2x^2$
6. $(x^3 + x^2) + (2x^3 - 5x^2)$ $4x^3-4x^2$
7. $(3x^2 - 5x + 10) + (2x^2 + 8x - 40)$ $5x^2+3x-30$
8. $(6x^4 + 3x^3 - 1) + (4x^2 - 3x + 3)$ $6x^4+3x^3+4x^2-3x+2$
9. $(1.2x^3 + 4.5x^2 - 3.8x) + (-3.4x^3 - 4.7x^2 + 23)$
10. $(0.5x^4 - 0.6x^2 + 0.7) + (2.3x^4 + 1.8x - 3.9)$

c Subtract.

35. $(3x + 2) - (-4x + 3)$ $7x-1$
36. $(6x + 1) - (-7x + 2)$ $13x-1$
37. $(-6x + 2) - (x^2 + x - 3)$ $-x^2-7x+5$
38. $(x^2 - 5x + 4) - (8x - 9)$ $x^2-13x+13$
39. $(x^2 - 9) - (x^2 + 9)$ -18
40. $(x^3 + x^2) - (2x^3 - 5x^2)$ $-x^3+6x^2$
41. $(6x^4 + 3x^3 - 1) - (4x^2 - 3x + 3)$
42. $(-4x^2 + 2x) - (3x^3 - 5x^2 + 3)$

a Multiply.

1. $(6x^2)(7)$ $42x^2$
2. $(5x^2)(-2)$ $-10x^2$
3. $(-x^3)(-x)$ x^4
4. $(-x^4)(x^2)$ $-x^6$
5. $(7x^5)(4x^3)$ $28x^8$
6. $(10a^2)(3a^2)$ $30a^4$
15. $3x(-x + 5)$ $-3x^2+15x$
16. $2x(4x - 6)$ $8x^2-12x$
17. $-3x(x - 1)$ $-3x^2+3x$
18. $-5x(-x - 1)$ $15x^2+5x$
19. $x^2(x^3 + 1)$ x^5+x^2
20. $-2x^3(x^2 - 1)$ $-2x^5+2x^3$

27. $(x+6)(x+3)$

$x^2+9x+18$

28. $(x+5)(x+2)$

$x^2+7x+10$

29. $(x+5)(x-2)$

$x^2+3x-10$

30. $(x+6)(x-2)$

$x^2+4x-12$

31. $(x-4)(x-3)$

$x^2-7x+12$

32. $(x-7)(x-3)$

$x^2-10x+21$

33. $(x+3)(x-3)$

x^2-9

34. $(x+6)(x-6)$

x^2-36

35. $(5-x)(5-2x)$

$25-15x+2x^2$

41. $(x^2+x+1)(x-1)$

x^3-1

42. $(x^2-x+2)(x+2)$

x^3+x^2+4

43. $(2x+1)(2x^2+6x+1)$

$4x^3+14x^2+8x+1$

44. $(3x-1)(4x^2-2x-1)$

$12x^3-10x^2-x+1$

45. $(y^2-3)(3y^2-6y+2)$

$3y^4-6y^3-7y^2+18y-6$

46. $(3y^2-3)(y^2+6y+1)$

$3y^4+18y^3-18y-3$

47. $(x^3+x^2)(x^3+x^2-x)$

$x^6+2x^5-x^3$

48. $(x^3-x^2)(x^3-x^2+x)$

0

1. $(x+1)(x^2+3)$

x^3+x^2+3x+3

2. $(x^2-3)(x-1)$

x^3-x^2-3x+3

3. $(x^3+2)(x+1)$

x^4+x^3+2x+2

4. $(x^4+2)(x+12)$

$x^5+12x^4+2x+24$

5. $(y+2)(y-3)$

y^2-y-6

6. $(a+2)(a+2)$

a^2+4a+4

7. $(3x+2)(3x+3)$

$9x^2+15x+6$

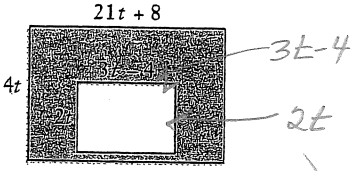
8. $(4x+1)(2x+2)$

$8x^2+10x+2$

9. $(5x-6)(x+2)$

$5x^2+4x-12$

61. Find a polynomial for the shaded area.

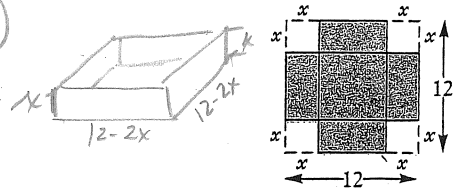


$A = 4t(21t+8) - 2t(3t-4)$

$= 84t^2+32t-6t^2+8t$

$A = 78t^2+40t$

62. A box with a square bottom is to be made from a 12-in.-square piece of cardboard. Squares with side x are cut out of the corners and the sides are folded up. Find polynomials for the volume and the outside surface area of the box.



$V = (12-2x)^2(x)$

$= (144-48x+4x^2)x$

$V = 144x-48x^2+4x^3$

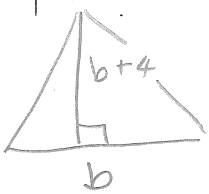
$S = (12-2x)^2+4(x)(12-2x)$

$S = 144-48x+4x^2$

$+48x-8x^2$

$S = 144-4x^2$

63. The height of a triangle is 4 ft longer than its base. Find a polynomial for the area.



$h = b+4$

$A = \frac{1}{2}bh$

$= \frac{1}{2}b(b+4)$

$A = \frac{1}{2}b^2+2b$